



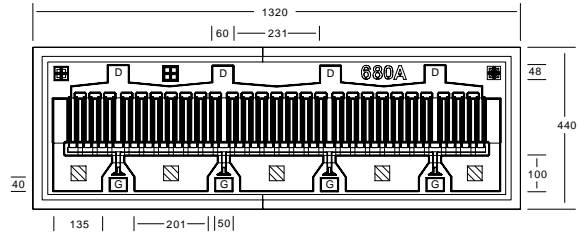
# EPA680A/EPA680AV

UPDATED 05/02/2006

## High Efficiency Heterojunction Power FET

### FEATURES

- +36.5dBm TYPICAL OUTPUT POWER
- 6.5dB TYPICAL POWER GAIN FOR EPA680A AND 8.0dB FOR EPA680AV AT 12GHz
- 0.4 X 6800 MICRON RECESSED "MUSHROOM" GATE
- Si<sub>3</sub>N<sub>4</sub> PASSIVATION AND PLATED HEAT SINK
- ADVANCED EPITAXIAL DOPING PROFILE PROVIDES HIGH POWER EFFICIENCY AND RELIABILITY
- Idss SORTED IN 160mA PER BIN RANGE



Chip Thickness: 45 ± 15 microns

☒ : Via Hole

No Via Hole For EPA680A

All Dimensions In Microns



Caution! ESD sensitive device.

### ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

SYMBOLS	PARAMETERS/TEST CONDITIONS	EPA680A			EPA680AV			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
P <sub>1dB</sub>	Output Power at 1dB Compression V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=12GHz	35.5	36.5		35.5	36.5		dBm
G <sub>1dB</sub>	Gain at 1dB Compression V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=12GHz	5.5	6.5		7	8		dB
PAE	Power Added Efficiency at 1dB Compression V <sub>ds</sub> =8V, I <sub>ds</sub> =50% I <sub>dss</sub> f=12GHz		33			36		%
I <sub>dss</sub>	Saturated Drain Current V <sub>ds</sub> =3V, V <sub>gs</sub> =0V	1250	2050	2690	1250	2050	2690	mA
G <sub>m</sub>	Transconductance V <sub>ds</sub> =3V, V <sub>gs</sub> =0V	1360	2150		1360	2150		mS
V <sub>p</sub>	Pinch-off Voltage V <sub>ds</sub> =3V, I <sub>ds</sub> =20mA		-1.0	-2.5		-1.0	-2.5	V
BV <sub>gd</sub>	Drain Breakdown Voltage I <sub>gd</sub> =6.8mA	-13	-15		-13	-15		V
BV <sub>gs</sub>	Source Breakdown Voltage I <sub>gs</sub> =6.8mA	-7	-14		-7	-14		V
R <sub>th</sub>	Thermal Resistance (Au-Sn Eutectic Attach)		6			5.5		°C/W

### MAXIMUM RATINGS AT 25°C

SYMBOLS	PARAMETERS	EPA680A		EPA680AV	
		ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>	ABSOLUTE <sup>1</sup>	CONTINUOUS <sup>2</sup>
V <sub>ds</sub>	Drain-Source Voltage	12V	8V	12V	8V
V <sub>gs</sub>	Gate-Source Voltage	-5V	-3V	-5V	-3V
I <sub>gsf</sub>	Forward Gate Current	30.6 mA	10.2 mA	30.6 mA	10.2 mA
I <sub>gsr</sub>	Reserve Gate Current	-5.1 mA	-1.7 mA	-5.1 mA	-1.7 mA
P <sub>in</sub>	Input Power	33.5 dBm	@ 3dB Compression	33.5 dBm	@ 3dB Compression
T <sub>ch</sub>	Channel Temperature	175°C	175°C	175°C	175°C
T <sub>stg</sub>	Storage Temperature	-65/175°C	-65/175°C	-65/175°C	-65/175°C
P <sub>t</sub>	Total Power Dissipation	23 W	23 W	25 W	25 W

Note: 1. Exceeding any of the above ratings may result in permanent damage.  
2. Exceeding any of the above ratings may reduce MTTF below design goals.

Specifications are subject to change without notice.

Excelics Semiconductor, Inc. 310 De Guigne Drive, Sunnyvale, CA 94085

Phone: 408-737-1711 Fax: 408-737-1868 Web: [www.excelics.com](http://www.excelics.com)

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# EPA680A/EPA680AV

UPDATED 05/02/2006

## High Efficiency Heterojunction Power FET

### S-PARAMETERS EPA680A 8V, 1/2 Idss

Freq (GHz)	S11		S21		S12		S22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
1	0.943	-164.0	7.210	90.7	0.009	21.7	0.681	-174.6
2	0.944	-173.1	3.626	78.2	0.011	23.5	0.697	-174.5
3	0.945	-176.8	2.393	68.8	0.011	26.1	0.711	-173.2
4	0.942	-179.5	1.770	60.1	0.013	36.0	0.727	-172.8
5	0.941	178.9	1.441	52.6	0.014	41.6	0.745	-172.3
6	0.940	176.6	1.133	44.8	0.015	45.8	0.765	-172.6
7	0.944	174.7	0.921	38.3	0.016	48.4	0.798	-172.8
8	0.944	173.0	0.761	32.0	0.015	47.5	0.817	-173.6
9	0.942	171.1	0.638	25.9	0.016	53.6	0.840	-174.0
10	0.945	169.2	0.550	20.4	0.017	54.5	0.857	-175.2
11	0.947	167.6	0.477	15.2	0.018	52.5	0.870	-175.8
12	0.946	166.5	0.422	10.5	0.020	52.9	0.885	-177.2
13	0.946	165.3	0.376	5.9	0.021	46.6	0.887	-178.3
14	0.948	165.0	0.339	1.6	0.023	53.1	0.904	-179.8
15	0.939	164.4	0.309	-2.1	0.024	47.6	0.900	179.5
16	0.945	164.5	0.285	-5.0	0.022	45.8	0.914	178.6
17	0.938	164.5	0.262	-9.1	0.024	45.2	0.920	177.4
18	0.931	164.8	0.240	-11.9	0.028	41.0	0.915	175.8
19	0.937	164.8	0.223	-14.8	0.028	40.1	0.926	175.8
20	0.931	165.3	0.211	-16.4	0.033	41.9	0.936	175.3
21	0.919	163.0	0.195	-20.6	0.036	39.0	0.948	175.1
22	0.924	161.1	0.185	-23.2	0.038	40.6	0.935	176.8
23	0.907	159.4	0.180	-26.0	0.043	35.9	0.949	175.1
24	0.908	156.4	0.173	-29.9	0.049	31.5	0.937	175.2
25	0.898	155.1	0.169	-33.5	0.056	29.0	0.944	173.6
26	0.888	152.3	0.168	-37.4	0.066	24.1	0.939	172.1

Note: The data included 0.7 mils diameter Au bonding wires: 4 gate wires, 15 mils each; 4 drain wires, 15 mils each; 10 source wires, 7 mils each.

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# EPA680A/EPA680AV

UPDATED 05/02/2006

## High Efficiency Heterojunction Power FET

### S-PARAMETERS EPA680AV 8V, 1/2 Idss

Freq (GHz)	S11		S21		S12		S22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
1	0.962	-166.0	7.084	90.5	0.011	16.4	0.651	-175.5
2	0.965	-174.4	3.544	79.4	0.012	17.2	0.660	-175.8
3	0.968	-177.9	2.340	70.9	0.011	25.3	0.665	-175.1
4	0.971	180.0	1.727	62.9	0.013	32.7	0.683	-174.6
5	0.970	179.9	1.334	56.3	0.012	38.2	0.712	-176.1
6	0.974	178.3	1.089	49.5	0.013	43.4	0.733	-176.6
7	0.974	177.2	0.918	43.0	0.013	53.8	0.748	-177.4
8	0.976	175.6	0.785	37.5	0.015	55.3	0.768	-177.2
9	0.981	174.6	0.684	31.2	0.014	55.3	0.784	-178.6
10	0.978	173.2	0.598	25.1	0.013	58.5	0.808	178.6
11	0.975	171.9	0.523	20.9	0.018	62.1	0.835	178.2
12	0.984	170.5	0.463	15.4	0.016	62.8	0.853	176.4
13	0.984	170.9	0.407	10.7	0.017	59.7	0.848	174.3
14	0.980	169.1	0.349	6.4	0.019	62.2	0.860	173.8
15	0.991	169.7	0.320	3.4	0.017	58.8	0.869	172.0
16	0.973	168.6	0.281	-1.3	0.017	53.4	0.884	170.0
17	0.993	168.0	0.256	-5.1	0.017	59.0	0.888	168.5
18	0.981	167.8	0.226	-8.3	0.017	50.7	0.906	167.7
19	0.986	166.4	0.210	-11.8	0.018	51.7	0.911	166.2
20	0.989	165.4	0.196	-14.6	0.020	45.1	0.910	165.5
21	0.981	159.4	0.192	-18.9	0.022	42.2	0.920	165.7
22	0.986	159.1	0.172	-22.8	0.021	45.3	0.931	164.4
23	0.987	158.3	0.160	-25.4	0.022	50.5	0.932	162.3
24	0.988	158.7	0.142	-28.2	0.024	51.6	0.936	159.1
25	0.980	158.9	0.126	-28.7	0.022	50.1	0.911	158.1
26	0.961	159.2	0.114	-30.3	0.027	50.9	0.933	157.5

Note: The data included 0.7 mils diameter Au bonding wires: 4 gate wires, 15 mils each; 4 drain wires, 15 mils each;

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电话：0755-82884100 83397033 83396822 83398585

传真：0755-83376182 (0) 13823648918 MSN: SUNS8888@hotmail.com

邮编：518033 E-mail:szss20@163.com QQ: 195847376

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西安劳动南路 88 号电子商城二楼 D23 号

TEL: 029-81022619 13072977981 FAX:029-88789382